NOTE XXVIII.

ON TESTUDO EMYS SCHLEG. & MÜLL. AND ITS AFFINITIES

BY

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(Plates 5 and 6).

In 1840 [1]) Schlegel and Sal. Müller described in number 2 of the zoological part of »Verhandelingen over de natuurlijke geschiedenis der Nederlandsche Overzeesche Bezittingen" a new species of *Testudo*, which differed from the other species of this genus by its broad, slightly elevated shell, and by the extra-ordinary large scales, which cover the outer parts of the forefeet, the heel of the hind feet and the parts between the hind legs and the tail. In their description of this species, which they named *Testudo emys*, they mention the presence of 25 marginal shields, among which one nuchal shield, of a moderate size, the posterior part of which is broad and straight-lined. The two posterior marginals (the caudals) are strongly bent downwards. Moreover they mention the large abdominals with two pairs of shields in front and two pairs of posterior shields. The pectorals, which were overlooked in this enumeration of shields of the plastron, are described as a shield on each side of the plastron under the 3rd and 4th

1) The publication of this work lasted from 1839 till 1844, so 1844 is generally taken as the year of publication of the description of *Testudo emys*; but the 2nd number containing this description was issued in 1840.

marginal, which shield in the shape of a scalene triangle is lying between the 2nd and 3rd pair of shields of the plastron, and runs down to the middle of the boundary line between these two shields.

The specimens of this species were captured in Sumatra, 1600 till 1800 feet above the level of the sea, in the neighbourhood of the river Aneh, south of the Goenong Singalang; and afterwards in the mountains east of Padang. In 1840 the Leyden Museum possessed six specimens, of which four are still present in our collections.

In 1851 A. Duméril, in his »Catalogue méthodique de la collection des reptiles du Muséum d'Histoire naturelle de Paris", gives a description of a species of *Testudo*, which he names *Testudo emydoides*, and which species he refers to *T. emys* Schleg. & Müll. His description agrees in all points with that of Schlegel and Müller, except in the enumeration of the shields of the plastron, inasmuch as Duméril mentions 12 shields composing the plastron, without giving any indication that two of these shields (the pectorals) have a triangular form and do not form a suture together. As the only specimen in the Paris Museum was a specimen from the river Aneh (Sumatra), and presented by the Leyden Museum, I think we may suppose that it was one of the six typical specimens and agreed with Schlegel and Müller's description.

In 1852 J. E. Gray [1]) described what he thought to be a new species of the Emydae, after a very imperfect shell, wanting several discal shields, from Singapore. He placed this species in a new genus »*Manouria*", characterized by its double, separated caudal plates, and its short subtriangular pectoral shields, only occupying the angle between the outer edge of humural and abdominal shields. Gray calls his new species *Manouria fusca*.

In his Catalogue of shield-reptiles, 1855, Gray men-

1) Proceed. Zool. Soc. 1852, p. 134.

tions two specimens of *Manouria fusca*, both from Pinang, in the collections of the British Museum.

In 1860 the British Museum got another specimen of *Manouria fusca* from Australia (?), labelled Murray-river-turtle. Gray [1]), in describing and figuring this third specimen (the first complete one, the others being but shells without the animal), states his genus *Manouria* to be a typical land-tortoise, and severs it from the family of the Emydae in which he had formerly placed it.

A species, described by Leconte [2]) in 1854 under the name of *Teleopus luxatus* from Java, must, according to Gray, be regarded as a species of the genus *Manouria*, probably as *Manouria fusca*.

In 1853 E. Blyth [3]) described a great Burmese land-tortoise, under the name of *Testudo Phayrei*, with double caudal plates, very long and thick imbricated scales on the forelimbs, similar great elongate scales at the heel, and a group of 5 principal obtuse spines on either side of the tail, the median of them remarkably strong and thick. As habitat of this species Blyth mentions Arrakan, Tenasserim Provinces.

These specimens described by Blyth were afterwards examined by John Anderson [4]), who compared them with specimens of *Manouria*, and found that these tortoises resembled one another in all points except in the arrangement of the pectorals. In the *Manouria*-specimens the pectorals were separated from each other, whilst the pectorals of the two specimens of *T. Phayrei* formed a suture with each other. Moreover Anderson observed that the *Manouria*-specimens had concave sterna, those of *T. Phayrei* being flat. As the *Manouria*-specimens were captured in a locality in Cachar, and *T. Phayrei* was from Arrakan,

1) Proceed. Zool. Soc. 1860, p. 395, pl. XXXI (not 1863 as given in Boulenger's Catalogue, p. 158).

2) Proceed. Ac. Philadelphia, 1854, p. 187.

3) Journ. As. Soc. Beng. XXII, p. 639.

4) Proceed. Zool. Soc. 1872, p. 132.

Anderson tried to get some more specimens and succeeded in this attempt by the aid of Capt. Butler, who procured him three living specimens and two shells from one locality in Assam. Only one of these specimens had a concave sternum and in this specimen also the pectorals were separated from one another; whilst in the four other specimens with flat sterna the pectorals formed a suture together. From this, Anderson concludes that *Manouria fusca* and *Testudo Phayrei* are one and the same species »indicating two types of variation (one characteristic of the flat, the other of the concave sterna): the former being a suture of variable intensity in the middle line, the second a pectoral plate of variable development between the middle line and a short distance internal to the inner margin of the axilla." Anderson is inclined to think that these last specimens with concave sterna are the males, and states that no specimen with flat sternum (which he thinks to be the females) as far as he knows off has the pectoral plates wholly apart. Supported by the authority of Dr. Günther [1]) that *Manouria fusca* is the same species as *Testudo emys* Schleg. & Müll., Anderson brings both *T. Phayrei* and *M. fusca* to *T. emys* and concludes his interesting article with a description of this species based on the living specimens he had got from Assam.

Anderson's opinion as to the synonymy of the three named species has been accepted by most of the later writers on this subject; f. i. the late Dr. Strauch takes the same view where in his »Bemerkungen über die Schildkrötensammlung" he writes [2]): »denn einerseits hat Anderson nachgewiesen dass die so eigenthümliche Stellung der Pectoralplatten nur den Männchen von *T. emys* Müll. & Schl. zukommt, während bei den Weibchen diese Platten in der gewöhnlichen Weise in der Mittellinie des Brustschil-

1) Anderson, l. c. p. 138, and Günther, Rept. Brit. India, 1864, p. 10.

2) Bemerkungen über die Schildkrötensammlung im Zoologischen Museum der Kais. Acad. d. Wissensch. zu St. Petersburg, 1890, p. 12.

des zusammenstossen"; and Boulenger mentions in his description of *Testudo emys* [1]): „the pectoral shields may be widely separated from each other or form a short median suture."

Dr. G. Bauer [2]), however, is not so sure that the Sumatra-species is the same as that of the continent. Though he admits that there is a great possibility that there exists but one continental form and that *Scapia Falconeri*, *S. Phayrei*, *S. gigantea* and *Manouria fusca* may be synonymous, still he points to some differences in the form of the skull of the typical specimen of *Teleopus luxatus* Leconte from Java and the skull of *Manouria fusca* as figured by Gray. As to the Sumatra-species, Bauer had no opportunity to compare a skull or a drawing of a skull of *T. emys* with those of the other species, and therefore declares himself incompetent to solve the question of the synonymy of this species. He states three possibilities:

1° *Testudo emys* differs both from the continental as well as from the Java-species.

2° *Testudo emys* is identical with *Manouria fusca*.

3° *Testudo emys* is identical with the Java-species: *Teleopus luxatus*.

As the typical specimens of *T. emys* are in the collections of the Leyden Museum, I thought it worth while to try to solve this vexed question, but failed in the ultimate solution of the problem, owing to the fact: that none of our four Sumatra-specimens (two stuffed ones, one small one in spirits, and one skeleton) was provided with a statement as regards its sex. They all had the pectorals separated from each other, and flat sterna; the skeleton only having an indication of a convexity in the region of the femorals; and though it was very improbable still it was possible that all these specimens were males.

1) Catalogue of the Chelonians, Rhynchocephalians and Crocodiles, 1889, p. 158.

2) Dr. G. Bauer, Bemerkungen über verschiedene Arten von Schildkröten. Zool. Anz. 1892, p. 155.

The fact that from 1840 until 1896 never a specimen was found in the many collections from Sumatra that were forwarded to our Museum, indicates *T. emys* must be a rather rare species. Still in January of this year we had the good luck to receive a large specimen of *T. emys*, which had died in the Zoological Garden at Rotterdam. This specimen, which was captured at Padang in Sumatra, was a female with a great many nearly full-grown eggs. It has the pectorals widely separated from each other.

This fact settles it, that in the Sumatra-form, whether it may be regarded as an other species or only as a variety of the continental form, the pectorals are separated in the female specimens, with the flat sterna.

In this point *T. emys* differs from *T. Phayrei*, in which latter the specimens with the flat sterna (probably the females) have the pectorals forming a suture together. As to the males of our Sumatra-species, it is very improbable that, in contradiction with what happens in the continental form, the pectorals would form a suture. Moreover, in looking over our specimens, the fact strikes us that the distance between the pectorals is not the same in all specimens; it is largest in our skeleton-specimen, and as that specimen is just the only one with an indication of a concavity in the femoral region, I think it very probable that, in accordance with *T. Phayrei*, in the males of *T. emys* the distance between the pectorals is larger than in the females. I am strenghthened in this opinion by a communication I got, through the kindness of Mr. A. A. van Bemmelen, director of the Zoological Garden at Rotterdam, about another specimen of *T. emys*, still living in the Garden. In that specimen, which has also an indication of a concavity in the femoral region, the relation between the distance between the pectorals and the length of the sternum is as 1 to 2,6, in our skeleton the relation is as 1 to 2,9; whilst in our other specimens it is resp. 1 : 3,3, 1 : 3,4, 1 : 3,8 and 1 : 4. I think the specimen, living at Rotterdam, to be a male, in which case it would be proved

that in *T. emys* as well as in *T. Phayrei* the distance between the pectorals is largest in the males.

In the following table, in which the specimens are enumerated according to their size, *a* is a specimen preserved in spirits, *b* and *c* are stuffed specimens (of which *b* is in a bad condition), *d* and *e* are preserved as skeletons (*e* being the newly acquired specimen from Rotterdam), and *f* is the specimen still living at Rotterdam, which after its death will make part of our collections. I suppose the specimens *d* and *f*, both showing some concavity in the femoral region, to be males.

	a	*b*	*c*	*d*	*e*	*f*
	Cm.	Cm.	Cm.	Cm.	Cm.	Cm.
Length of sternum from gular to caudal notch.	16,4	17,8	30,5	31	42,5	46
Distance between the pectorals.	4,8	5	7,5	10,5	11,2	18
Length of the gulars	2,5	2,9	4,7	6,4	6,8	—
Length of the brachials . . .	3,4	3	6,6	5,8	8,8	—
Length of the abdominals . .	6,3	6,9	11,5	12	17	18
Length of the femorals. . . .	2	2	4	3,6	6	—
Length of the anals.	3,1	4,1	6,2	6,6	8,1	5
Distance between the inguinals.	9,9	10,2	16,5	17	23,4	—
Greatest length over the curve from gular to caudal notch.	20,5	22	37,5	41	55	52

On comparing our two skulls of *Testudo emys* with the figure of the skull of *Testudo Falconeri* (the skull of one of the typical specimens of *Testudo Phayrei*) as given by Gray [1]), we see that the forepart of the skull of *T. emys* is much more acute, that its lower jaw ends in a sharp point, and that the processus ectopterygoideus is much more developed in *T. emys* than in *T. Phayrei*.

The same points of difference were stated between the skull of *Teleopus luxatus* and Gray's figure by Bauer, who

1) Proc. Zool. Soc. 1869, p. 170.

had the advantage of examining the typical specimen of *T. luxatus*, and I think *T. luxatus* synonymous with *T. emys*, and the Java-form (if the specimen described by Leconte was really captured in Java, which I think rather problematical, as never one specimen of the genus *Testudo* reached the Leyden Museum from Java) as identical with the Sumatra-form.

As to *Manouria fusca* Gray, perhaps it might be a species differing from *Testudo emys*, or from *Testudo Phayrei*, or from both of them, and peculiar to the peninsula of Malacca or to the island of Pinang. Gray mentions as a difference between the skull of *T. Phayrei* and that of *Manouria fusca*, that the former has a broad, well-developed zygomatic arch, the arch in *Manouria fusca* being slender and weak. When, however, the female specimen from Pinang, mentioned under *a* in the Catalogue of Chelonians in the British Museum, has its pectorals forming a suture together, I should feel inclined to regard *Manouria fusca* identical with *Testudo Phayrei*: if, on the contrary, its pectorals are separated from each other, *Manouria fusca* should be nearer related with *Testudo emys*.

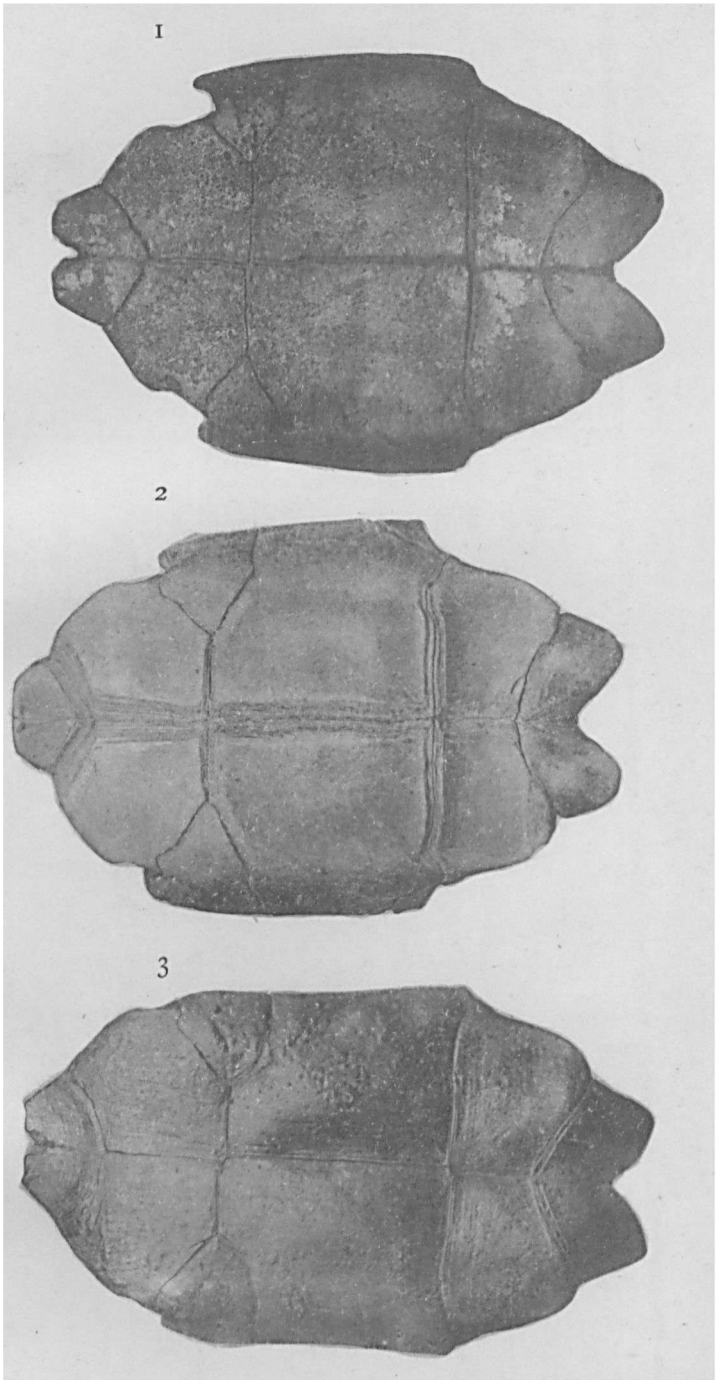
Leyden Museum, February 1896.

EXPLANATION OF PLATES 5 AND 6.

Testudo emys Schleg. & Müll.

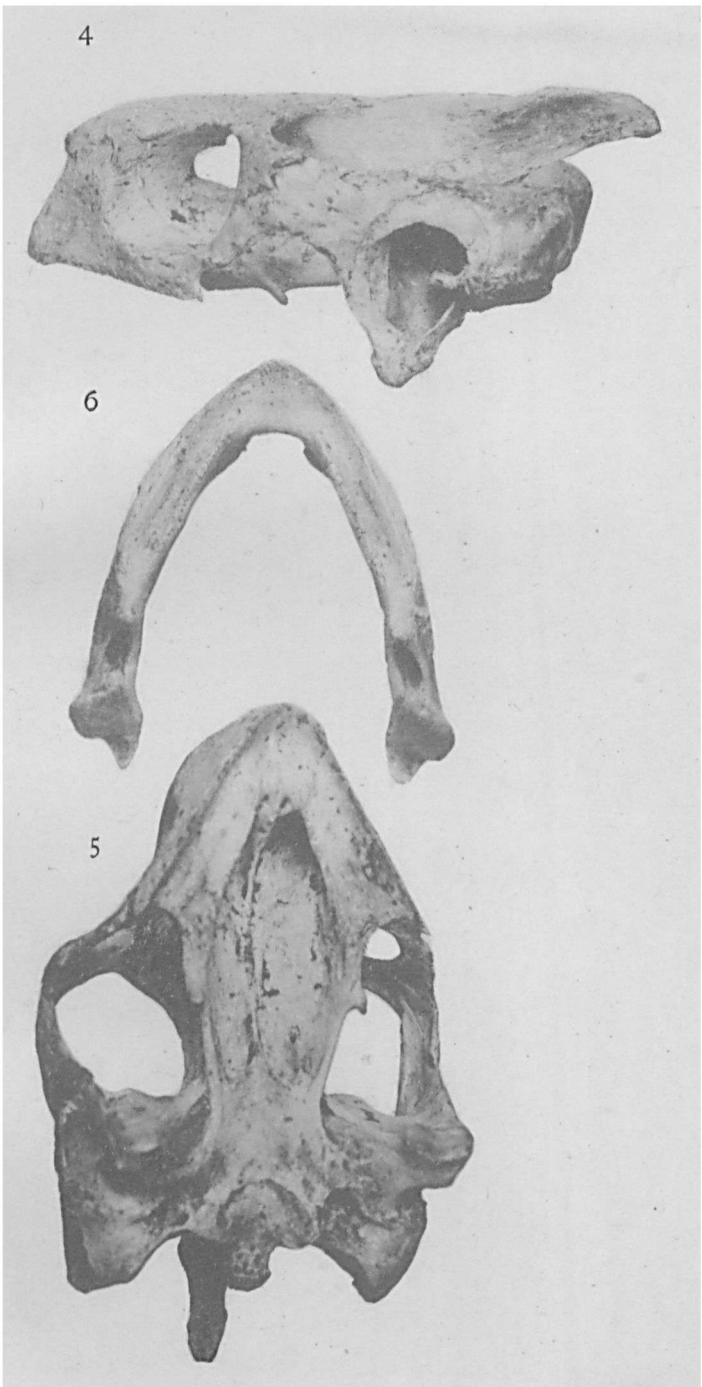
Fig. 1. Sternum of specimen *d.* [1])
» 2. » » » *e.*
» 3. » » » *c.*
» 4 and 5. Skull of specimen *e.*
» 6. Lower jaw of specimen *e.*

1) Vide p. 203.



J. C. Wäkerlin, phot. Lichtdruk van H. Kleinmann & Co., Haarlem.

Testudo emys *Schleg. & Müll.*



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Testudo emys *Schleg. & Müll.*